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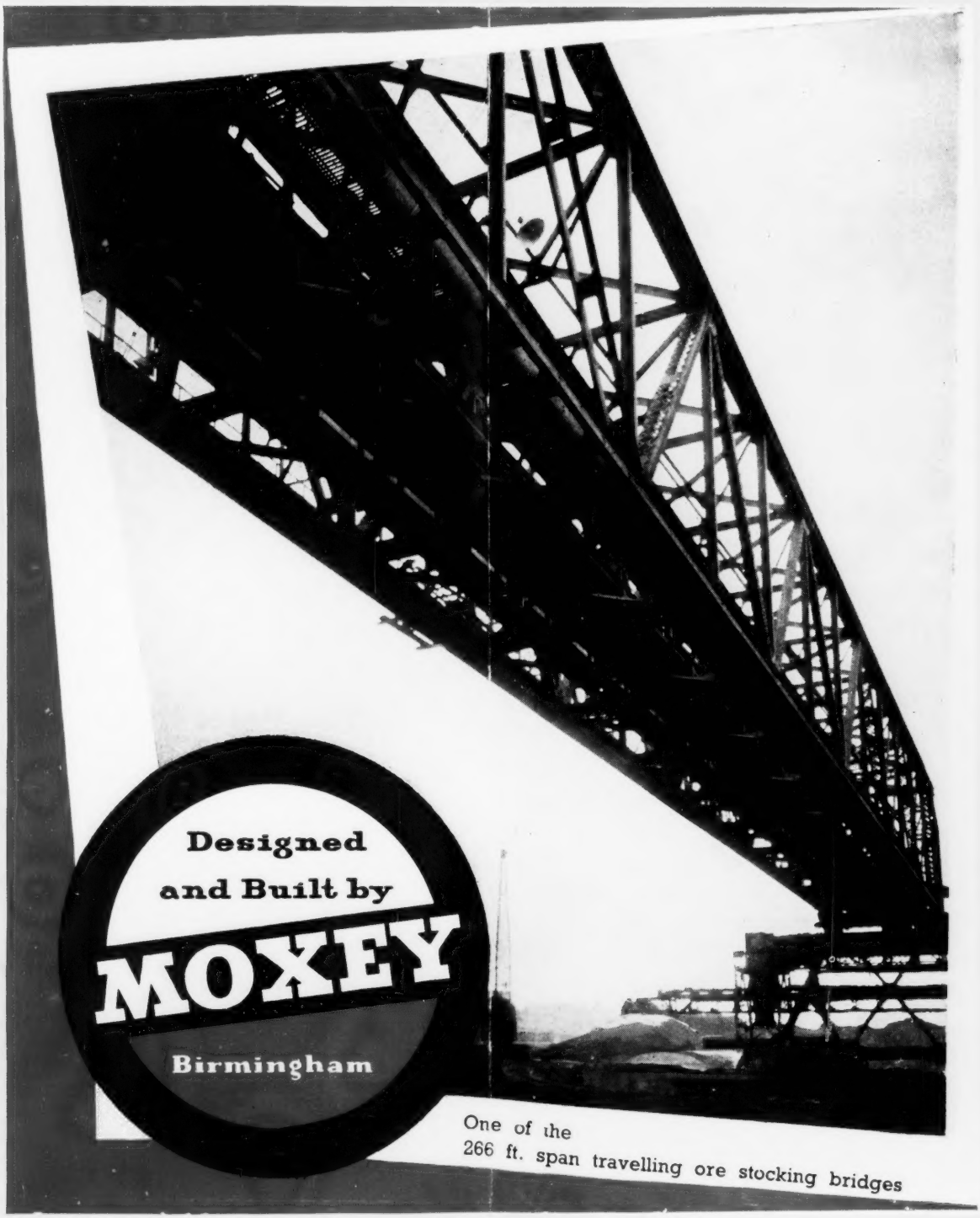

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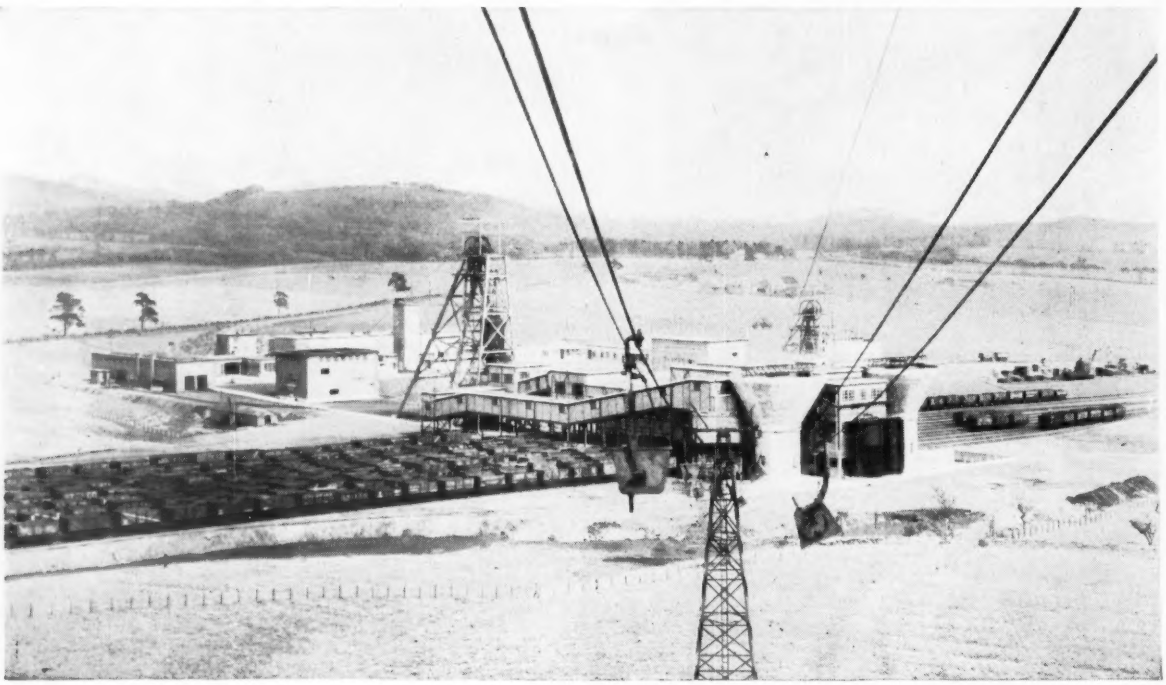

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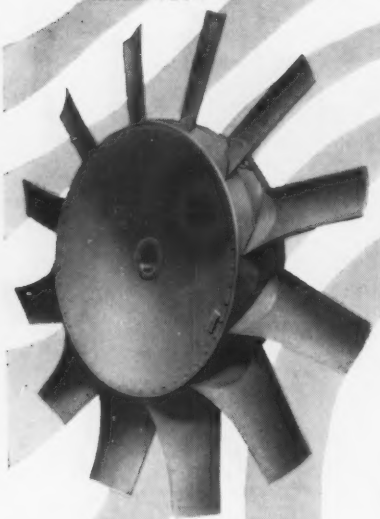

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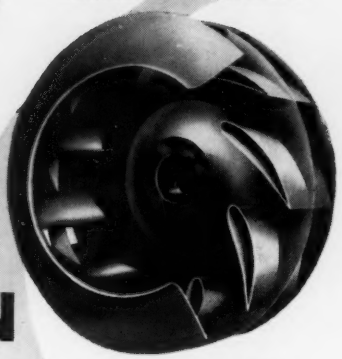

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Established 1835

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Prospect and Retrospect

The lull in the tempo of activity between Christmas and the New Year provides for many of us an opportunity of re-assessing the events of the past year and the outlook for the months ahead. If, to-day, it is no easier than a year ago to foresee the shape of things to come, it is none the less possible to define some of the issues, the outcome of which are of particular concern to the mining industry. The short-term problems, which as always are primarily political and economic, naturally appear the more pressing, although never have the long-term prospects held out to us by the scientist held a more fateful import for the future of mankind—for good and evil alike.

If Russian intransigence has appeared to some to have been less absolute during the past year, there is as yet no evidence to suggest that this change is other than tactical, and indeed it is only necessary to look at the events of the recent past in territories within the Chinese sphere of influence to see that this is so. Admittedly in saying this we must presuppose the continued cohesion of the Moscow-Pekin axis, and it may well be that in the more distant future a weakening, if not a rupture, of this despotic link between East and West may prove to be one of the decisive events in history. But, for immediate practical purposes, it must be assumed that Moscow and Pekin speak in unison, if not with one voice.

Writing here a year ago of the United States, we suggested that 1954 might well hold the answer to two queries of transcendental importance for the free world. First, did the Administration, we wondered, have the know-how and authority to avert the cumulative consequence of impending recession? Secondly, were we about to witness another American retreat from internationalism? In retrospect it can be said that the events of the past year on the American scene have been reassuring on both these counts.

After a spring and summer of uncertainty as to the future economic trend, the upswing in business activity has come with a rush since the autumn so that to-day there is little doubt that boom conditions, whether engineered or merely fortuitous, are to be the order of the day in the coming months.

The year in Washington has been marked by the vocal and influential efforts of the Isolationalist lobbies both on the political and economic fronts. These the President has in the main successfully resisted. Inevitably, he has had to make concessions in doing so, although these have been reflected in the watering down, or retarding, of some of his legislative programme rather than in the surrendering of any basic position. Now that the policies of the Republican right wing have been unequivocally condemned at the mid-term elections it may well be that, on some issues at least, he will find a Democratically controlled Congress more sympathetic to his policies than were the backwoodsmen of his own party.

The regrettable antics of the French Assembly added to returning prosperity in Western Europe has led to a growing inclination in Washington towards diverting economic—as distinct from military—aid to other areas where the expenditure may perhaps be expected to yield higher dividends—political and economic. At the moment the tussle as to whether South East Asia or Latin America shall be the principal beneficiary through the reorientation of American aid appears unresolved. On the one hand, it would seem as if the Isolationists, forced to concede that the U.S.A. is now in many respects a " have not " nation as regards her mineral requirements, have fallen back to prepared positions along the line of Pan American self-sufficiency regardless of the statistics for many metals such as tin, columbite, manganese, chrome, diamonds and uranium which make nonsense of this modified Isolationism even as an expedient of military strategy. The exponents of aid for South East Asia, on the other hand, regard their policy primarily as a weapon of the cold war.

The extent and duration of American mineral self-sufficiency are of course basic to the debate which has raged in Washington and all over the States on tariffs and other alternative high price support devices and, by implication, on pricing policies. Although the Protectionists are far from being routed, it is not without significance that Mr. Felix Wormser who, before joining the Eisenhower Administration, had been closely identified with proposals for a singularly punitive system of sliding scale tariffs on lead and zinc, told the American Mining Congress last September that the exploration and discovery of new mineral resources in the States was lagging behind the country's growing requirements, and that the impact of two world wars had hastened the depletion of readily available domestic ore reserves in many mineral categories.

On the same occasion Mr. Simon D. Strauss, *à propos*

the outlook for copper, lead and zinc, expressed the view that the American domestic base metal industry was threatened quite as much, if not more, by the challenge from both steel and the newer light metals as by competition, "unfair" or otherwise, from foreign base metal producers. Tariffs, he pointed out, afford no protection to base metal miners against competition from other metals and in so far as both tariffs and stockpiling tend towards feather-bedding they serve only to price the older metals out of the market.

It has indeed been one of the characteristics of the past year, that since the final sweeping away of controls in 1953, price is once more showing signs of becoming a dominant factor in mining policies. In this connection, price stability may well prove as important as the price level itself. Thus it may well be, for example, that in the long run the marketing methods and price policies of the aluminium producers may make considerable headway against intrinsically cheaper although more erratically priced copper, and the decision in Washington to cancel the "third round" aluminium expansion programme in favour of increased reliance on Canadian suppplies must have been dictated, at any rate in part, by that country's big advantage in the cost at which additional power supplies are likely to become available.

Copper itself supplies a good example of the re-emergence of price as a primary market factor. In America, copper now stands at 30 c., at which price a considerable amount of low grade domestic production (some say as much as a 250,000 tons per annum) will soon be coming on the market, much of it under the stimulus of government price support contracts. Stockpiling apart, however, it may well be asked just what level of consumption can in the long term be sustained with copper at 30 c., and whether the purely sectional interests of the American copper mining and fabricating industries, no less than of the economy as a whole, would benefit by increased copper usage at, for example, the old 24 c. level even if this implied a growing reliance on imported metal, or if Washington had to subsidize the sub-marginal production to which it is committed.

Another characteristic of present day metal markets is the disinclination of the consumer to hold stocks at levels which before the war would have been regarded as no more than a prudent minimum. Nearly 14 years of controls, during which stocks were in effect carried and financed by Government, has seemingly produced a new generation of metal users to whom stock holding as it was understook pre-war is still a novelty. Moreover recent events have tended to foster this state of affairs.

Thus within the past two or three years U.S. government stockpiles of copper, aluminium and tin have at different times been raided to rescue the consumer from precarious situations, while in the case of tin, the International Tin Agreement, if ratified, will provide what amounts to a central reserve which will automatically become available to the consumer above a pre-determined market price.

In copper, we have already witnessed, since the resumption of free dealings, an extension of the practice of long term sales contracts between producer and consumer which, if rumour is to be believed, has now reached the stage where leading Commonwealth producers are discussing the possibility of effecting long term collective price agreements with British consumers. If the consumer is in fact going to allow the producer to act as his stockholder and surrender the freedom of action which the holding of adequate stocks confers, economic history suggests that he will be unable to do so without in the long run paying handsomely for the accommodation.

The readiness with which the U.S. government came to the aid of the copper market this autumn (once the strikes were over and with them the political risk of strike breaking accusations) illustrates one of several directions in which stockpiling, in origin a purely strategic conception, is now evolving into an instrument of market manipulation. A further illustration of this may be seen in the President's new long term stockpile programme for domestically mined lead and zinc, which is more or less frankly admitted to be a price maintenance device, and as such is clearly preferable, so far as foreign mining interests are concerned, to the more penal import duties which this programme was designed to avert.

This may be all very well, and no doubt with longer experience a more sensitive technique may be developed for utilizing the stockpile as an instrument of market manipulation although the dangers arising from miscalculation, were made painfully clear in the case of the U.S. government's disastrous tin marketing operations during 1951. Moreover the producers of minerals of which the U.S.A. is predominantly an importer must, under these circumstances, always be at the mercy of sudden policy changes whether benevolently intended or made in the interests of military strategy or simply an instinctive reaction against "gouging" tactics, imagined or real.

In any event it can no longer be said that metal delivered to the stockpile may be regarded as permanently off the market. Equally, no free commodity market can be expected to operate smoothly with the threat of vast stocks overhanging it. Moreover, in some directions it is beginning to look as if the U.S. Administration continues the stockpile because it dare not stop, and in any event, it is difficult to escape the conclusion that sooner or later this whirlwind harvest must be gathered—it remains to be seen by whom.

Outside the United States mining has for better or worse continued to play a dominant part in the economies of a number of countries. In Canada the boom has continued with little, if any, abatement, yet even so the really impressive characteristic of the Canadian economy is not so much its present strength as its even greater potential. The opening up of Labrador and Northern Quebec, the tremendous significance of the St. Lawrence seaway and power projects, the remarkable rise in nickel output in response to demand, the oil boom and intensive prospecting programme in the "prairie provinces," the coming into production of the first stage of the Kitimat scheme and the other vast development schemes in British Columbia and in the Yukon all point to a dynamic and firmly based economy. It is a tragedy for Britain that these developments should have coincided with a period of exchange difficulties which have undoubtedly played their part in greatly reducing the investment of British capital in this robust member of the Commonwealth—investment which would unquestionably be welcome.

Elsewhere in the Commonwealth—in South Africa—we can now see the approaching completion of another vast capital investment programme, in this case largely financed from London. Already nine of the gold mines in the Orange Free State have commenced production and three more should begin milling next year. Although one way and another quite a lot of additional capital in the aggregate may still be required before all the mines are running to capacity, together with their ancillary industries and civic services, it seems probable that the bulk of this necessary capital will be forthcoming from the industry itself out of the profits now beginning to flow from the new mines.

Capital apart, a limiting factor in the initiation of all such new schemes is, of course, the supply of labour both

native and managerial. As regards the former, the shortage though threatening has not yet made itself felt very acutely. However, the pinch may come later, as none of the new O.F.S. mines are as yet working anywhere near to their ultimate milling capacity. Meanwhile, improved methods and increased mechanization have already brought about a considerable increase in productivity (the average tonnage of rock handled per native per month underground in 1946 was just under 27½ tons whereas to-day it is over 33), while the monthly native employment figures are themselves now substantially better than a year ago. Nevertheless, once the O.F.S. mines are in full production the South African gold mining industry is expected to require over 400,000 miners, or about 100,000 more than are at present employed. They may take some finding.

The industry is no less concerned to-day regarding the future supply of mining engineers to staff its new mines and in due time to provide the next generation of senior managers. The largest of the groups has already introduced a most far-sighted scheme for recruitment and training, and the Chamber of Mines may be about to follow suit.

It is characteristic of the O.F.S. mines that they will operate at a markedly higher level of costs per ton than are familiar on the Rand. Also, it seems likely that throughout the field there will be a greater degree of faulting and, consequently, somewhat more uncertainty regarding development results. On the other hand, the field as a whole is a much higher grade proposition and it is being suggested in some quarters that two or three of the most promising mines may mill a grade of 20 dwt. or more—unheard of figures in terms of Rand experience.

Currently the Union's rate of gold production is close to the all-time record year of 1941, and earlier this year Mr. Harry Oppenheimer forecast that within the next four years the value of South Africa's gold and uranium output would increase by £100,000,000—an increase of approximately 50 per cent over the present value. Consequently, with such golden rewards in prospect the time may well be approaching when the investor and the miner may both pause to enquire "what next?" The Van Den Heeversrust, Bethel, Saaiplaas, and Erfdeel areas may all have the makings of further gold mines and in any event it seems likely that a colliery will eventually be established at Van Den Heeversrust to meet the growing power requirements of the O.F.S. Moreover, it has yet to be seen whether the potentiality of the Klerksdorp area as a uranium producer has as yet been fully explored.

The Union's political event of the year was the announcement, at quite short notice, of Dr. Malan's retirement from public life, which became effective at the end of November. He is succeeded as Prime Minister by Mr. Strydom, an ardent nationalist, who is well known for his strong Republician views. It seems unlikely, however, that in the short term this change of leadership will have any marked influence on the mining industry and it is more likely that Mr. Havenga's retirement, which coincided with that of his chief, will at any rate in the immediate future prove to be the greater loss to the Government in its relations with the mining industry and with the world's treasuries.

The not inconsiderable difficulties of Rhodesian mining this year, at all events on the Copperbelt, may be summed up under the headings labour and power. The present power difficulties are largely a product of the bottleneck in communications, which is strangling the economic development of the Federation. In the field of labour relations, although the difficulties experienced have not resulted in any appreciable loss in production this year, they hold a serious threat for the future harmonious working of the Copperbelt and, in a wider context, for the political future of the Federation. While the European mineworker is paying careful lip service to the principle of gradual African advancement, tactically he is effectively obstructing it with his insistence upon linking African advancement to the European wage structure. This is essentially an issue which will not improve with time. All things considered the relatively inexperienced African Unions have so far shown more patience and a greater sense of responsibility than might have been feared, but the conclusion is inescapable that sooner or later more forceful tactics will be employed if their reasonable aspirations are not met. It is in the nature of the problem that concessions can only come from the European union, but there are at present no signs of any genuine awareness in that body of where its duty to the community or, indeed its own best interests, lie.

The power shortage is now costing the Copperbelt something like £20,000,000 a year in lost copper revenue. The rail crisis is apparently endemic and we once again have the spectacle of a nationalized undertaking failing to measure up to the size of its rapidly growing task. It is difficult to escape the conclusion that the failure is less one of performance than of vision in correctly gauging the Federation's potentiality for economic growth. In contrast we have the spectacle of Wankie Colliery, which under a revitalized management has in the past 18 months transformed the Federation's coal supply picture out of all knowledge, but for the moment to little purpose owing to the inadequate railing facilities available. Quite aside from existing restrictions on copper output, provision must be made for the requirements of the new mines coming into production during the next few years and in this context the importance of making rapid progress with the Kafue hydro-electric scheme is self-evident.

In Southern Rhodesia efforts have been made to find means of supporting the small mine owner—particularly the gold miner, while a major event among the big companies has been the impact of Selection Trust's Bikita property on the lithium market.

Although no figures are as yet available, it is reasonable to suppose that the mining industry in the Congo, aside from tin, has had another good year. Geologically, as well as geographically, the principal mining areas of the Congo have a close affinity with the Copperbelt. The former is already making an important contribution towards the relief of the Copperbelt power shortage, while the possibilities of the Congo's rich uranium deposits having their counterpart across the border are increasingly being canvassed. Moreover, despite the very different native labour policies pursued in the Congo there can be no doubt that European and native alike is measuring closely the progress towards African advancement on the Copperbelt.

Events in the Gold Coast, have been marked by the moderation and keenness which Dr. Nkruma's government has continued to show. Particularly significant for the mining industry has been the incorporation into the new Gold Coast constitution, on his initiative, of a provision to ensure that if, at any time in the future nationalization of an industry became necessary, fair compensation would be paid to the original owners. While this sensible piece of legislation was no more than many expected the assurance was necessary if only to attract the foreign capital necessary to underwrite the projects envisaged in the country's expanding economy. The foremost of these may well prove to be the Volta River project the feasibility of which will not however be known until the preliminary commission submits its report next year.

Elsewhere in British West Africa interest has been focussed on the immediate and mid-term outlook for columbite, the stockpile position for which may prove to have been over-estimated with the result that producers

of the mineral are now uncertain as to its future price at the end of 1956 and, as a corollary, their own plans for expansion. In Sierra Leone diamond depredations still bulk large, although security provisions have been tightened perceptibly and are strengthened by the opening of a diamond market in Accra which provides a working base from which to exercise close supervision.

Throughout much of Asia the mining interest has been preoccupied with two major concerns. In the first place uncertainty as to the political outlook has inevitably coloured what would normally have been predominantly business decisions, while more generally in the sub-continents of India and South-East Asia, as well as in China, (all three of which are relatively speaking still geologically under explored areas), the emphasis has been on plans for mineral exploration rather than on production. The inconclusive outcome of the Indonesian war has temporarily arrested, but has done little to remove, the long-term threat to Thailand, if not to the whole Malayan Archipelago. Somewhat unexpectedly the year has seen a sharp increase in Malayan tin production, stimulated no doubt by the prospect of tin control, and it is becoming increasingly urgent that prospecting for fresh tin-bearing ground should be widely resumed if, in the years ahead, Malaya is even to meet the somewhat reduced level of production she may expect under quota conditions.

In Australia gold production, which in 1953 attained its highest level for 14 years, has continued its upward course, stimulated no doubt in part by plans for Commonwealth and State assistance for the Westralian gold industry. A number of mines have featured in merger or take-over operations and there is a general impression of streamlining and vitality about the industry. Aside from gold, public interest has been concentrated on the search for uranium which is showing signs of developing into a major industry, and—on the West coast and in New Guinea—for oil. In the coal industry something of a landmark has been reached with the acceptance by the New South Wales coal-miners of the practice of mechanical extraction of pillars which they have resisted for so long.

Across the Pacific in Latin America the picture is somewhat confused. In Bolivia there are indications that the decline in tin output, which to many people has always seemed a logical consequence of the expropriation of the old mine managements, is now becoming a reality. If this proves to be the case, economic necessity may well dictate some re-orientation of the Government's attitude towards foreign know-how and, as a concommitant, towards foreign capital.

In Chile we have witnessed the continuance of the triangular tussle between government, American capital and local labour for the lion's share of the copper profit. Although, with the exact provisions of the new copper legislation still unknown, it is difficult to see precisely where the balance of advantage at present lies, it would certainly seem as if organized labour has emerged the most advantageously from the alarms and excursions of the past year, and it remains to be deduced from the new labour laws and exchange control arrangements whether the bulk of the much increased labour bill is to be footed by the Government or the copper companies or whether it is to be carried by the profits from a much expanded production.

In Brazil the picture is one of widespread prospecting and considerable mining expansion under the stimulus of the impulse towards pan-Americanism to which we have already referred. In the Caribbean, mineral production is still largely the province of the aluminium and oil companies, although it seems likely that the interesting developments, of which there have been signs in the north-west of British Guiana, as in other parts of the colony, would long since have come to fruition, were not communications in the hinterland well-nigh non-existent.

The inflationary consequences of Mexican devaluation have probably dissipated most of the advantage of this move which might otherwise have accrued to the mining industry. More significant perhaps, have been recent proposals to establish domestic fabricating industries instead of exporting to the U.S.A., as at present, some 80 per cent of the copper and 90 per cent of the lead and zinc production in the virgin state.

As always, our information concerning the Russian mining industry is too meagre and too speculative to afford us more than an occasional glimpse of its achievements. It seems extremely probable that the unexplored mineral potential of the Soviet Republics is tremendous. At the same time mineral consumption per head of population appears still to lag far behind the industrialized nations of the West. If the rumours of the high priority being accorded to her gold production may be credited this would at least be consistent with her present policy of increasing imports from the free world and with the sales within the past year or so of platinum, manganese and other metals to the West.

Outside of coal and iron, Western Europe has long ceased to be one of the world's major mining areas, and as a substantial net importer of most minerals, the communities on both sides of the Channel must perhaps watch more closely than most the vagaries of American mineral policies.

In Great Britain the passage of the new Mines and Quarries Bill has been a notable event, more especially for the attempts which have been made at redefining the duties and responsibilities not only of the mine manager but of the mine owner as well. The domestic metal mining industry remains in the politically embarrassing condition of being neither quite dead nor perceptibly alive, and with the lower price levels for tin, lead and zinc of the past two years, seems likely to remain thus until the Chancellor deems it worth while to introduce tax reforms discriminating frankly in favour of the industry. The future of the British overseas mining industry—an ever dwindling entity as more and more companies emigrate—is equally in his hands, and despite certain budget reliefs, H.M. Government still shows no awareness of the fiscal measures necessary to London's continuance as a leading mining finance centre. The opportunities for mining investment overseas have seldom been better, and the London capital market has not been in better trim since the end of the war. All that is needed is the fiscal relief necessary to make worthwhile a type of investment, which carries an intrinsically high degree of risk.

Throughout the world, the mining industry has now for more than fifteen years experienced conditions of almost continuous expansion, and the younger members of the industry can perhaps be excused for accepting this condition as a natural phenomenon. Certainly few could deny that, against all the expectations born of pre-war experience, the future continues for the present to be set fair. That this should be due in part to the need for military preparedness is now a familiar irony, but if, in the years ahead, we have the good fortune to witness the cold war congealing into peaceful co-existence, we may yet find that natural population growths in America and elsewhere, coupled with refinements in the techniques of a controlled inflationary progression, may prolong prosperity indefinitely. Such at least is the secret hope, if not the expectation, of many people to-day.

Western United States

(From Our Own Correspondent)

Portland, Oregon, December 1.

A suit which may have far-reaching consequences has been filed against the U.S. Government by Mrs. Gladys Laycock, owner of a controlling interest in the Dixie Meadows mine in Grant County, Oregon, in which the plaintiff asks "for compensation and damages for the value of property taken by the United States." The complaint attacks as unconstitutional all laws appertaining to the production, sale or other dispensation of gold passed by Congress in 1933 and 1934 and all executive orders or proclamations promulgated in accordance with those laws. It was in accordance with those laws that the United States "went off the gold standard" and the President and Secretary of the Treasury directed that all gold mined in the country must be sold to the treasury at a fixed price and ruled it unlawful for anyone to possess gold of a value in excess of $100. It is alleged in the complaint that such executive orders and proclamations prevented the plaintiff from operating her mine at a profit and damages are sought accordingly.

The above is a brief résumé of an involved document. While many legal actions have been brought under the acts of 1933 and 1934, mostly by the government and assuming the constitutionality of those acts, this is believed to be the first attack on their validity. It is hardly necessary to enlarge on what the outcome may be should the plaintiff prevail. It would mean a free market for gold mined in the United States, an eventual revaluation of the dollar and a return to the gold currency standard, with probable repercussions throughout the world.

THE BASE METALS

The last conflict in the copper strike was settled in the middle of October, thus ending an interruption of production of more than six weeks and an estimated loss of output of 70,000 tons. It is difficult to estimate just when the industry will get back to normal following the prolonged interruption.

Much interest is being directed toward the Pima mine, a recent development in Arizona which first attracted attention because its discovery was wholly due to a geophysical survey, the entire area being masked by 200 ft. of alluvium. When the geophysical notes indicated the possibility of a deposit, a drilling programme was carried on, a 600 ft. shaft sunk and 2,500 ft. of lateral workings driven. Stopes have been opened on four levels and 50,000 tons averaging six per cent copper shipped, much of it recovered in the course of development. In the meantime, continued exploration demonstrated that both walls of the deposit are mineralized, indicating a large tonnage averaging 1 to 1½ per cent. Thus, this supposedly small high grade mine may turn out to be a large low grade producer. If worked by open pit methods there will be 200 ft. of stripping but this will not be too serious as all is alluvium.

An encouraging move in the lead-zinc field is that United Park City Mines in Utah has resumed operation after a shut-down of two and one-half years. United Park City is a coalition which embraces various old properties of the prosperous days of the camp and controls the greater part of the productive area.

From Colorado comes word that Telluride Mines is enlarging its lead-zinc-copper mill from 900 to 1,400 tons daily after being closed down for 18 months. While the company has made no definite announcement of plans to resume production it is taken for granted that it will do so when the enlargement of the mill is completed.

COMMERCIAL DEMAND FOR URANIUM

Mr. J. C. Johnson, director of the Raw Materials Division of the Atomic Energy Commission, has made a significant forecast on further commercial demand for uranium. Mr. Johnson foresees, based on studies of power requirements made by A.E.C., that by 1965 nuclear plants will be supplying a substantial portion of the demand for commercial power, especially in areas of high cost generation. The studies indicate that nuclear power capacity may be 12,000,000 kW. by 1970, 42,000,000 by 1980 and 100,000,000 by 1990. A world market of 14,000 tons of uranium by 1980 is a possibility. These estimates may appear extravagent but in view of the source must be entitled to consideration.

A.E.C. has opened a new ore buying station in southeastern Utah to serve the White Canyon area and has announced plans for doubling the capacity of its various treatment plants now in operation. Minerals Engineering Co. is building a pilot plant at Grand Junction for developing a process by which uranium ores may be concentrated by small, perhaps portable, plants at individual mines. This would effect a material saving in haulage from the mines to the present treatment plants, some of this over considerable distances.

Some figures have been given out which indicate why Atlas Corporation was willing to pay $9,000,000 for Mr. Vernon Pick's Delta mine. With only one-fortieth of the 240 acres in the 12 claims thoroughly developed there are 300,000 tons of ore blocked out, showing an average value in place of $40 per ton, a gross value of developed ore of $12,000,000. Past production has been at the rate of 1,500 tons per month but this will be materially increased.

It is interesting to note that among the many established mining companies that have turned to uranium the preponderance seems to be among the lead-zinc producers. This appears to be especially the case among the Coeur d'Alene operators. This does not mean that they have any intention of abandoning their former operations, but that the activity in uranium offers an opportunity to diversify their interests while awaiting a revival of the industry in which already they have substantial investments.

The government-owned magnesium plant at Manteca, California, built during World War II, has been leased to Western Pyromet Co. which will convert it to titanium production. Indications are that the government is planning an enlargement of its titanium programme, which at present calls for an annual output of 30,000 tons by 1957. Union Carbide and Carbon Co., already committed to the present programme, has signed a contract for construction of a plant designed to produce 7,500 tons annually.

EXPANDED MERCURY PRODUCTION

The increase in the price of mercury continued and an all-time high level of $325 a flask was maintained through October. Many domestic producers shut down while the price was depressed and have been reluctant to resume production for fear of a sudden collapse. Since the price has advanced steadily throughout the year—sensationally since spring—a number of producers seem to have decided that it will hold at least long enough for them to recapture any capital involved in reopening and there has been a considerable revival in the industry. New Idria, the largest producer in the country, has enlarged its mining and furnace operations and is continuing development with satisfactory results. Cordero and Sonoma, the next largest producers, are working at capacity and are carrying on exploration for new ore bodies while a number of lesser properties have been put on production in recent months.

World Resources of Lithium—I

The new importance attached to lithium by the current A.E.C. programme coupled with the rapid development of the Bikita lithium ore deposits in Southern Rhodesia has aroused particular interest in this little known metal. In the following article North American sources of supply are described, while in a concluding instalment, lithium resources in South and South West Africa and Southern Rhodesia are surveyed, followed by a brief exposition of the metal's uses and market outlets—militarily and industrially

Lithium was discovered more than a century ago by a Swedish chemist, Johan August, Arfwedson, when carrying out a complete analysis of a new mineral, petalite from the island of Uto near Stockholm. For many years it had little commercial significance, but during the past two decades systematic research has revealed many applications for the metal, its alloys, salts and ores. Lithium is also a key material in the manufacture of hydrogen bombs.

Before the first world war the annual demand for lithium and its compounds amounted to a mere 200 s.tons (as equivalent of lithium carbonate). During the second world war it soared to 1,000-1,500 tons, but fell back to an average of some 550 tons in the immediate post-war years. Another steep rise in consumption occurred in 1950 and demand is now running at a high level. In view of the rapid expansion in industrial uses, together with the (presumably) rising requirements of thermonuclear programmes, it seems evident that production will require to be stepped up considerably to supply future demand. In the United States, the Defense Procurement Administration alone has called for an annual output of 5,000 s.tons by 1955. The potential world consumption is now believed to be about 10,000 tons a year.

Lithium is a fairly abundant element in the earth's crust and deposits are so concentrated that mining costs can be relatively low. Yet it is only in a very few countries that deposits, with a high enough lithium content and sufficient tonnage to be economically exploited, are known to exist.

PRINCIPAL SOURCES

At present the principal sources of lithium and its compounds are lepidolite, amblygonite, petalite and spodumene. The lithia content of these minerals, in terms of lithium oxide, fluctuate in typical cases from about 3 per cent to 10 per cent. Values found in particular areas are cited in the course of this article. Other lithium bearing minerals which have been exploited to a limited extent include zinnwaldite, triphilite and lithiophylite.

Lithium is also a minor constituent of many muscovite-granites and has been found in very small amounts in certain waters. A number of mine waters, especially some in the Redruth district of Cornwall, have been found to carry lithium compounds.

Lithium minerals are recovered from their ores by froth flotation and by hand picking. Both processes are relatively inefficient and emphasis in research is therefore being placed on the development of new and improved processes.

In 1946, the world production of lithium minerals amounted to 4,465 l.tons, virtually the sole producers being the U.S.A. (2,737 tons of lithium minerals and compounds) and South-West Africa (1,680 tons). In 1952 there was a world output of 24,020 tons, of which the U.S. accounted for 13,938 tons, South-West Africa for 8,751 tons, and Southern Rhodesia for 1,321 tons, leaving a production of only 10 tons from all other sources.

The supply-demand pattern for 1952 becomes particularly interesting when it is considered that the entire U.S. production was absorbed by the home market, and that the U.S. was not only the largest producer but also by far the largest importing country. Fortunately for the U.S., the Commonwealth and Western Europe, the future outlook for supplies has since been radically altered by the rapid expansion of production in Southern Rhodesia, which is now the world's largest exporter of lithium ores.

UNITED STATES

The D.P.A.'s target of the equivalent of 5,000 tons of lithium carbonate production capacity by January 1, 1955, requires as raw material the equivalent of nearly 50,000 s.tons of spodumene averaging 5 per cent contained lithia. The known reserves available for domestic production are substantial.

According to the authors of the Paley Report,[1] deposits of spodumene carrying about 6 per cent of lithium oxide in the Kings Mountain district of North Carolina are said to be sufficient " to serve industry for several hundred years, even if all the wildest dreams about the future tonnage demand for lithium became reality." These deposits are worked by the Foote Mineral Company, whose expansion programme includes doubling the capacity of its plant at Exton, Pa, and the construction of a lithium chemical plant at Sunbright, Va.

The American Potash and Chemical Corporation are exploiting deposits at Searles Lake, California, estimated to contain nearly 100,000 tons of lithium chloride. Since 1952 this company has been converting the bulk of its raw material to lithium carbonate.

In 1952, the Lithium Corporation of America completed a new flotation mill near Hill City, S. Dakota, and began beneficiating spodumene ore from one of several deposits which it owns. Its wholly owned subsidiary, the Metalloy Corporation, has expanded its facilities for lithium chemical manufacture at St. Louis Park near Minneapolis.

CANADA

Important lithium-bearing pegmatites occur in Quebec and Manitoba. In North-western Quebec a relatively new company, Quebec Lithium Corporation, is being brought to production under the aegis of Sullivan Consolidated Mines, which holds the controlling interest. The ore reserve is generally regarded as the largest known source of lithium in North America. The potential is placed at 20,000 tons per vertical ft., or 10,000,000 tons down to the 500-ft. horizon. The average lithia content is estimated at 1.3 per cent. The company's holdings total over 12,000 acres containing approximately 17,000 ft. strike length of the favourable contact area. Exploratory drilling has so far been confined to an area of only about 1,000 acres. The mill is designed to handle 1,000 tons per day initially and production is scheduled to start in September, 1955. A contract has been negotiated with the Lithium Corporation of America for the sale of 165 tons of concentrates per day over a period of five years. The concentrate will be treated in the new refinery and treatment plant which the Lithium Corporation is currently building in North Carolina.

It was reported recently that Iso Uranium Mines had arranged for an immediate drilling programme on one of its two claim groups held under option in the important new lithium area of North-western Quebec.

REFERENCES

1. " Resources for Freedom." Vol. IV, pp. 95, 96.

S.A. MINING TRENDS—VI

Current Mining Practice at St. Helena

St. Helena Gold Mines, the first Orange Free State producer, was incorporated in South Africa in 1946 and came into production in November, 1951. The company is in the Union Corporation Group and the following article, the fifth in a series of eight, describing current mining practice of at least one company in each of the chief South African groups, have been specially contributed to *The Mining Journal* by a South African correspondent. In this article, an interesting description is given of St. Helena's shaft system, current mining methods, and reduction plant facilities. Of particular interest will be the author's comment that development eastwards is expected to encounter reef of a progressively higher grade. So far, development at St. Helena has been more or less confined to the sub-outcrop zone in the central and northern sectors of the company's very large lease area.

St. Helena has two shafts, the No. 3 and the No. 4. The No. 3, 30 deg. incline shaft 18 ft. x 9½ ft., and sunk to a depth of 2,928 ft. on the incline, is now used exclusively as an upcast ventilation duct. In addition, a series of upcast 10 ft. dia. concrete-lined vertical winzes have been sunk in the vicinity of No. 4 Shaft to depths of 600 to 1,200 ft. from surface. These winzes are equipped with exhaust fans on the surface. The main shaft, No. 4, is concrete-lined, vertical, elliptical in shape, 40½ x 14 ft. on the axes, with four main hoisting compartments, one service compartment, and an upcast ventilation compartment. The hoisting capacity is about 100,000 tons a month.

The St. Helena Reduction Plant

ADDITIONAL HOISTING SHAFT

From the bottom level of No. 4 Shaft, a prospect winze is being sunk which may later be enlarged to a sub-incline shaft. No. 4 Shaft is equipped with a sub-bank that has two loading levels, one for materials and the other for personnel. The latter is connected by enclosed tunnels to the European and Native changehouses.

In due course, an additional hoisting vertical shaft will be sunk. The site has not yet been finally determined but will be in the north-eastern section, contiguous with the Western Holdings and President Brand properties.

OPTIMISTIC OUTLOOK FOR DEVELOPMENT ON REEF

So far development at St. Helena has been confined more or less to the sub-outcrop zone in the central and northern sections of the lease area. Development eastwards —that is, on dip to depth on what is expected to be reef of a progressively higher grade—will be preceded by exploratory drilling. The drilling will disclose geological information for both the planning of this development and for determining the site of the additional vertical shaft.

Development proceeds by means of contour reef drives advanced in the first place from every alternate level, namely at 340 ft. vertical intervals. The intermediate levels and contour drives are advanced subsequently, the vertical intervals then being reduced to 170 ft. Large radius curves or bends are obviously necessary to facilitate tramming or hauling along the contour drives, and to provide the required radius the drives at places are deviated from the reef into the country rock. Raises are cut from the contour drives at strike intervals of about 600 ft. and footwall crosscuts are taken back a short distance under each raise with a box-hole connecting both. Drive pillars are provided at both ends of each raise.

Stoping is conducted according to standard group practice. The relatively high incidence of local faults makes mechanical scraping of the stope faces in the sub-outcrop zone difficult. Accordingly, the broken stope ore is manually lashed into ¼-ton end-tipping cars. These are hand-trammed on 18 in. gauge tracks laid in strike gullies from the raise to near the stope faces. The ore is tipped into the raise and scraped down to the box by 20, 30 and 60 h.p. electric scraper winches. From the boxes, the ore is trammed or hauled in 5 and 10 ton drop-bottom cars by 4, 6 and 8 ton diesel locos to the shaft pass system. The tracks in the contour drives and level haulages are 3 ft. gauge.

WINZES ON SUB-OUTCROP

Along the sub-outcrop, four vertical winzes down to isolated reef blocks have been completed and a fifth is now being sunk. These are connected with the contour drives by crosscuts or raises from the appropriate levels. Drilling south of the present workings is being conducted as the prelude to the advance of development in that direction.

To raise the capacity of the cyanide section to a level commensurate with the milling capacity, two additional thickeners, another clarifier and filter are being installed. By these installations the overall capacity of the reduction plant will be increased to slightly more than 100,000 tons a month. A further expansion of reduction plant capacity will be effected when the additional vertical shaft has been completed.

SECTIONALIZED HEAVY INSTALLATIONS COUNTERACT UNSTABLE FORMATIONS

To counteract the unstable surface and sub-surface alluvium of the Karroo formations, foundation areas have been reduced to minima by sectionalizing heavy installations (e.g. erecting the crusher section in primary and secondary units, etc.), providing mat foundations for heavy-bearing points (e.g. in the case of the mills), and incorporating movement or expansion joints in long installations (e.g. in the conveyor tunnels and the filter house floor).

The consumption of pebbles in the milling circuits is reduced to the available level by utilizing rod mills in the primary circuit. Three grinding units have been installed each consisting of a primary rod mill in open circuit with a simplex spiral classifier. The classifier is in closed circuit with a secondary tube mill. In addition, there are two tertiary tube mills each in closed circuit with a duplex spiral classifier.

Progress in the Design and Construction of Mine Surveying Instruments

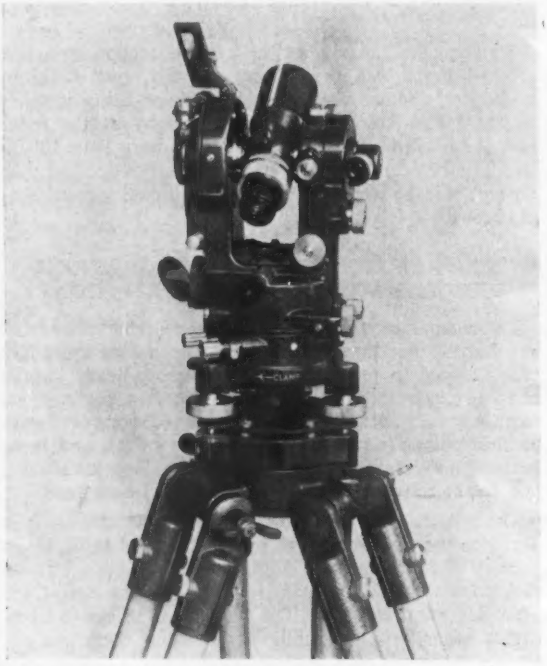
The increasingly heavy demand for mine surveying instruments for surface and underground work has been the direct outcome of the greatly expanded mining and prospecting activities taking place throughout the world. Not unnaturally, the range and function of surveying instruments has been much extended, as indeed will become apparent from the following article which has been based on a visit to the Watts Division, Hilger and Watts Ltd., by a representative of *The Mining Journal*, who was shown mine surveying instruments incorporating the company's most recent principles of design and construction. Throughout the article stress is laid on the importance attached to light weight and compact construction.

The range of instruments at the disposal of mine surveyors is now wider than before the second world war, while the improved efficiency and convenience of modern equipment are advantageous underground.

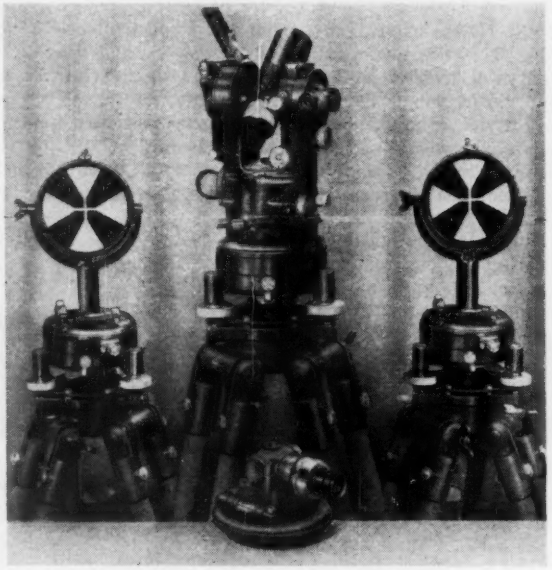
The most important development in recent years is the use of glass circles, which has permitted a reduction in the size of theodolites. Formerly, circles were divided on metal and read by means of verniers, which were not always easily legible, particularly in the difficult conditions frequently encountered underground. Glass has proved superior to metal as a material on which to graduate. It is stable, non-corrosive, and will accept a high surface polish. Above all, it can be engraved with such fine lines that a glass circle about half the size of the metal type can be read to greater accuracy.

RULING ON GLASS

There are at present only a few instrument manufacturers in Great Britain who have mastered the technique for ruling on glass. The average width of the lines ruled is from 3 to 5 ten-thousandths of an inch. Ruling is done by dividing machines accurate to within one second of arc, which is equivalent to five millionths of an inch at a distance of one inch. More graphically, one second of arc might be described as the angle through which a railway line three miles long would tilt if a halfpenny on edge were placed under one end.



The No. 1 Theodolite



The Traverse Outfit

In order to take advantage of the reduction in size made possible by the introduction of glass circles, it became necessary to shorten the telescope. This was made possible by the use of triplet lens objectives in the telescope, which permit a reduction in length while maintaining magnification.

As a result of these developments, some theodolites of recent design will fit into cases as small as 11 in. x 6½ in. x 6 in., while the use of light alloys has allowed the combined weight of instrument and case to be brought down to as little as 15.5 lb.

BUILT-IN ILLUMINATION

An important feature of modern theodolites is built-in illumination, which allows observations to be made with greater certainty. The fact that glass is transparent allows the graduations to be viewed through microscope systems of high magnification, so that very accurate readings can be taken without strain on the observer. The circles are read through a single microscope eyepiece, mounted close to the telescope eyepiece and sometimes revolving with it, so that the observer no longer has to walk round the instrument when taking readings.

Natural light is reflected through the circles by means of an outside mirror, then through a system of prisms and an optical micrometer, and finally emerges through the eyepiece of the circle reader. This system gives brilliance to the readings and eliminates the parallax so often noticed in vernier theodolites.

Of particular interest to mine surveyors is the Watts No. 1 Microptic theodolite reading directly to 20 seconds. Images of the horizontal and vertical circles, together with that of the micrometer scale, are brought into the field of

view of a single eyepiece, so pivoted that it can be swung over and read from a position adjacent to the telescope eyepiece on either side of the instrument. The three scales are arranged symmetrically, one above the other. Both circles are divided directly to 20 minutes and are figured at each degree. The circle divisions are subdivided by the lowest scale, the micrometer, which is divided at 20 second inter-

The Microptic Transit

vals and there are figures at every five minutes, allowing estimated readings to be made to five seconds. Theodolites of this type have been exported all over the world and are extensively used in collieries, gold mines and base metal mines.

The performance of this instrument was recently investigated by G. P. Williams and M. M. Rossouw, whose report was published in the *South African Survey Journal*, 1954. The purpose of the investigation was to find out to what extent an instrument of this type could comply with the requirements of the South African Survey Regulations. In the experiments described, a Watts Microptic No. 1 was compared with a Zeiss Th. II single second instrument. In general, twice as many observations were taken by the Watts as were taken by the Zeiss. In order to make the tests under uniform field conditions, rather than under laboratory conditions, the observations were taken between trigonometrical beacons. The investigators found that the mean square error of a direction observed on one arc (mean of CL and CR with this arc adjusted for horizon closure) was four seconds. The accuracy laid down in the Regulations could be obtained using a 20 second theodolite, but the standard laid down for tertiary triangulations could not be obtained without an excessive number of observations.

ELIMINATION OF CENTERING ERROR

A recent development of interest to mine surveyors is the introduction of three-tripod traverse outfits, in which the theodolite may be precisely interchanged with the two sighting targets or with an optical plummet. All these units are made with interchangeable base fittings, which are quickly attached to or removed from the bases at the tripod heads. Accurate centering is ensured by the nature of the design.

A 20 second theodolite is sufficiently precise for most mining requirements, but a single second reading instrument permits more accurate and quicker laying down of initial triangulation for such projects as shaft sinking. It can also be used with advantage for the correlation of underground and surface surveys.

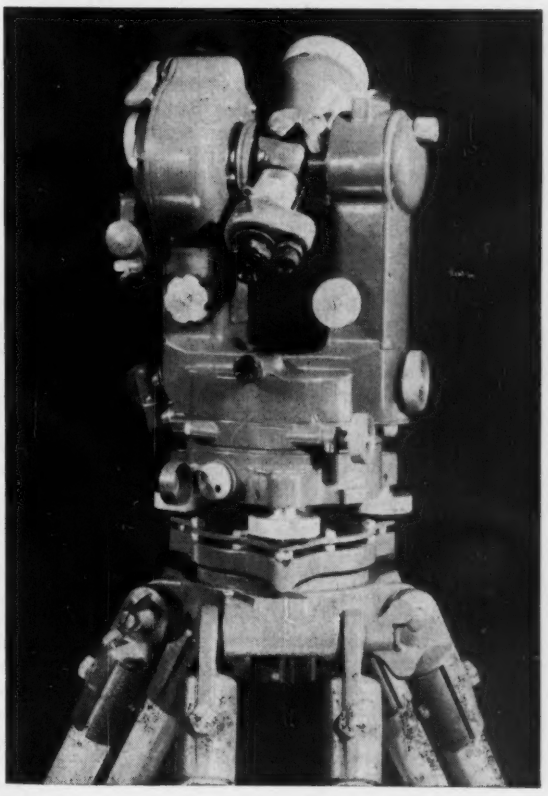
An example of a modern one second reading theodolite is the Watts Microptic No. 2, which by means of an optical system views the circles simultaneously from two points 180 deg. apart and gives the mean reading, thus eliminating any centering error. In the large central aperture seen in the field of view, is shown the main scale, while below it is the micrometer scale. In a small upper aperture are seen images of one or two sets of hair lines—single lines from one side of the circle and double lines from the other side. The single lines are extensions of alternate lines of the main scale which appear in the central aperture. As the circle is rotated, the single lines move in one direction across the field of view and the pairs of lines move in the opposite direction.

To take a reading, the main scale division on the right of the index line is noted; this gives degrees and tens of minutes. The micrometer knob is turned until the double sets of lines exactly straddle the single sets, and the reading on the lower micrometer scale is taken. This gives minutes and seconds. The reading of the main scale, and that of the micrometer, are added together to give the complete reading—an average of readings on both sides of the circle.

For many purposes, such as measurements at the working face, it is more important that observations should be made as quickly as possible than that they should be highly accurate. An instrument which has proved very satisfactory for applications of this type is the Microptic Transit.

THE MICROPTIC TRANSIT

Though designed primarily for mine survey work of a quite elementary character, the Transit is suitable for all but the most precise underground surveys. It can be set



The Microptic Theodolite No. 2

up and used with great speed, even in stopes as narrow as 30 in., and gives a general accuracy of one minute.

Instruments of this type are widely used by Colliery Surveyors and also on the South African gold mines. On independent tests, doubled angles were almost always correct to less than 30 seconds and never exceeded ± 1 minute. Measurement by repeated addition x 4 showed a probable error of ± 17 seconds. Tacheometric measurements at 300 ft. were almost always correct to 1 ft.; measurements up to 500 ft. were made with no errors exceeding 2 ft.

Progress in theodolite design has been paralleled by the development of improved instruments for measuring levels. On many modern telescopic levels the bubble in the spirit level is observed by a prism system, allowing a coincidence setting to be made which yields very much higher accuracy than observation of a graduated bubble type by means of a mirror. On some of the most precise levels several manufacturers now introduce the bubble image into the field of view of the telescope, so that it can be kept under observation while the levelling staff is being observed. The precise instruments are of value to the mining surveyor in making observations to determine ground subsidence due to underground workings.

Several automatic levels are being introduced in which the spirit level is replaced by some form of pendulous device. One of the latest instruments on the market, known as the Cowley automatic level, gives an accuracy of about ¼ in. in 100 ft. and is designed primarily for levelling operations on building sites.

ADVANTAGES OF LIGHTWEIGHT EQUIPMENT

Instruments used underground are liable to be subjected to conditions of a particularly exacting nature. In the world's deepest gold mines, for example, measurements may have to be made at a depth of 8,000 ft., sometimes at a temperature of 100 deg. F. and a humidity of the order of 95 per cent. At the Mysore Gold Mine, surveyors making the first observations at the deepest level were only able to take a few readings before being hauled to the surface, exhausted by the heat. Besides making the surveyor's task as light and easy as possible, instruments should therefore be capable of giving reliable service under conditions of corrosion and humidity which will rapidly find out any weaknesses in the best equipment.

Optical systems are completely encased in light alloy castings, specially treated to prevent corrosion, which are sealed as far as possible as a protection against condensation. Due to the number of moving parts theodolites cannot be completely sealed. It has been found, however, that condensation in humid climates can be avoided by protecting the instrument in a metal case, which can be sealed and can contain a dessicator to dry the air inside. Since a theodolite spends the greater part of its life inside its case, this method of protection results in a considerable increase in service life.

Instrument makers in the United Kingdom have been actively engaged for a number of years on research into problems associated with high temperatures and humidities and with the alkalinity or salinity of water. Owing to the equable nature of the British climate, it has been necessary to devise some means of artificially creating the conditions required for research and tests. In recent years the problem of humidity testing has been studied by the British Scientific Instrument Research Association, as well as by various Government establishments and by individual manufacturers. The knowledge thus gained has resulted in many changes, all tending to produce equipment which will give better service under the worst conditions.

Machinery and Equipment

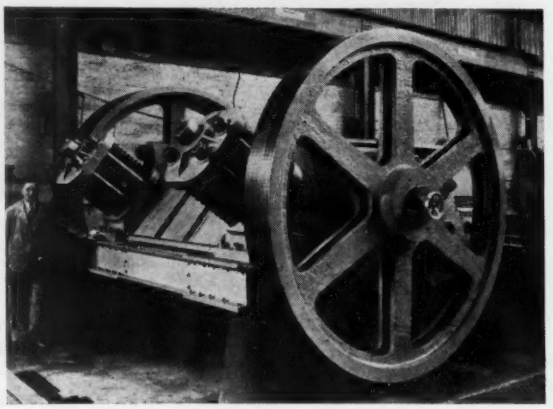
Low-cost Precision Surveys

The installation of three major types of airborne geophysical equipment in one aircraft has been achieved by a Canadian team of air surveyors and electronics specialists, according to a report from The Hunting Group of Companies. This "flying laboratory" consists of a Canso amphibian aeroplane incorporating an airborne magnetometer, a scintillation counter and an electromagnetic detector. The combination of the magnetometer and scintillation equipments in one aircraft enable data to be procured in one flight.

The major problem was to design an electromagnetic detector that could be used with a metal-skinned aircraft. The problem was solved by mounting a specially-designed compensating device outside the plane.

U.K. Equipment for Largest Opencast Coal Mine in Malaya

In our issue of December 10, 1954, it was reported that Jules Weitz tower cranes will soon be produced in the United Kingdom by Sheepbridge Equipment Ltd. Further news of interest reveals that the largest single slugger-roll crusher ever produced by Sheepbridge Equipment Ltd., together with other



The 48-ton single roll Sheepbridge crusher for Malaya

mining plant, is being despatched to Malaya to crush the overburden at an opencast coal mine there.

The opencast coal mine at Batu Arant, near Kuala Lumpur, is the largest in Malaya and has an overburden which in places is over 200 ft. deep. Here the heavy duty Sheepbridge apron feeder will be used in conjunction with the 48-ton Sheepbridge crusher, which will handle shale to 4 ft. x 4 ft. x 1 ft. 6 in. in size, reducing to less than 10 in. size.

Magnetic Separators for Mining Use

Permanent magnetic separators play an important role in the mining and quarrying industries. In an interesting pamphlet Electromagnetic Ltd. now announce two new additions to their range of permanent magnetic separators, the Unifeeder Type MHP and the Uniband Type OBP.

The Unifeeder is a separator built into a conveyor using Unimajor intensity, and gives automatic discharge of all tramp iron. This unit is claimed by the manufacturers to provide three times the strength of a magnetic pulley or drum of equal size. The Uniband, on the other hand, is a super intensity overband pattern separator. It is suitable for suspension above existing bands or chutes and is capable of extracting tramp iron through a maximum of 2 in.

As the Markets were closed over the Christmas holiday, our two regular features—Metals, Minerals and Alloys, and Mining Markets—are not appearing this week. They will be resumed in our next issue.

COMPANY NEWS AND VIEWS

Lake George's Loss

Despite a reduction in working expenditure during the year ended June 30, 1954, by Lake George Mines Pty. the Australian operating company of Lake George Mining Corporation, the continued weakness in base metal prices resulted in a group loss.

Year to June 30	*Tons Milled*	*Metal Content of Saleable Products**				
		Lead	*Zinc*	*Copper*	*Silver*	*Gold*
		Tons	*Tons*	*Tons*	*Oz.*	*Oz.*
1954	175,318	8,252	14,449	834	169,600	3,876
1953	178,290	8,223	14,316	861	183,383	3,944

* 10,844 tons of sulphur were also produced (1953 - 9,483 tons)

A total of 7,973 ft. of development (9,522 ft.) was accomplished during the year. Ore reserves as at June 30, 1954, rose to 1,949,300 tons as against 1,603,100 tons previously. This tonnage was estimated to contain 6 per cent lead, 10.75 per cent zinc, .58 per cent copper, 1.02 dwt. gold, 1.30 oz. silver.

Year to June 30	*Total Sales†*	*Revenue Misc.*	*Mining Costs*	*Group* Loss*	*To Reserve*	*Carry Forward*
	£	£	£	£	£	£
1954	1,306,662	13,780	1,271,685	31,997	NIL	81,300
1953	1,585,479	15,620	1,535,800	9,099	200,000	71,692

* Excluding credit of £41,605 (1953 - £44,771) arising from taxation over-provided in previous years
† Concentrates

Lake George ordinary 5s. shares stand at about 7s. Mr. R. M. P. Preston is chairman. Meeting, London, January 11.

Rough Diamond Price Increased by 2½ Per Cent

It has been announced by the Central Selling Organization which, through the Diamond Corporation, sells nearly 95 per cent of the world new diamond output, that there is to be a basic increase of 2½ per cent in the price of rough gem diamonds.

The currently high American demand for gem stones is mainly responsible for the present increase which by other commodity standards is modest. It will be remembered that in his statement to shareholders of De Beers Consolidated Mines last March, Sir Ernest Oppenheimer referred to gem stocks held by all producers and the Diamond Corporation as being at an "irreducible minimum." No great surprise should therefore have been caused by the increase which producers, faced with irreducible reserves, have brought about by allowing the free play of supply and demand to adjust prices to maintain revenues.

While considerable headway has been made towards broadening the market for diamonds, America remains by far the world's largest consumer. Business activity in the U.S.A. is therefore the criterion by which future prospects for the industry must be judged. Nevertheless, during the recent recession in the economy of that country it was a particularly favourable factor that the sales of gem stones held up so well. This consideration has undoubtedly had a large influence on share markets. Furthermore the widely held view that the future outlook for American industrial activity is bright has greatly contributed towards the changed basis of valuation for diamond shares. The prime example of this, is, of course, De Beers Consolidated Mines which at their present price of about £6 11s. 0d. return only 7.5 per cent.

Burma Corporation's Sharply Increased Profits

An estimate of production, revenue, and expenditure for the financial year ended June 30, 1954, has been published by Burma Corporation (1951) which discloses that net profits are expected to be £270,997 as compared with a loss of £198,348 for the preceding period. A substantial contribution to these good results was, however, made by sales of pre-war stocks of zinc concentrates.

A steady improvement in working profits has been reported throughout the company's year which culminated in a figure of £180,660 earned during the June quarter. This was more than double that of the March quarter.

Output figures showed that ore extraction increased during the year to 80,621 tons (32,114 tons) from which the production of marketable metals was 9,081 tons of refined lead (3,740 tons) 96 tons of refined antimonial lead (166 tons) 863,085 oz. of refined and doré silver (405,914 oz.) 154 tons of copper matte (65 tons) 161 tons of nickel speiss (171 tons) and 9,558 tons of zinc concentrates (5,000 tons).

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Mining Men and Matters

Mr. A. G. Stewart, chairman and general managing director of Stewarts and Lloyds, has been appointed president of the British Iron and Steel Federation as from January 1, 1955, in succession to **Mr. G. H. Latham,** chairman and managing director of Whitehead Iron and Steel Company. **Sir Ernest Lever,** chairman and chief executive of Richard Thomas and Baldwins and the Steel Company of Wales, has been appointed president-elect of the Federation.

The Institute of Metals: Awards of Medals. The Council of the Institute of Metals has awarded The Institute of Metals (Platinum) Medal for 1955 to **Dr. Colin James Smithells,** Director of Research, The British Aluminium Co. Ltd.; the Rosenhain Medal for 1955 to **Dr. William Albert Baker,** Research Manager, The British Non-Ferrous Metals Research Association, London; and, the W. H. A. Robertson Medal and Premium for 1954 to **Professor Hugh Ford** and **Mr. J. G. Wistreich.**

Mond Nickel Fellowships 1954. The Mond Nickel Fellowships Committee have announced the four following awards for 1954: **Mr. M. Brownlee** (Dorman Long and Co., Ltd., Redcar) to study British, Continental, and American hot and cold metal basic open hearth steel making with particular reference to furnace design and construction and factors affecting ingot quality. **Mr. R. D. Butler** (Imperial Chemical Industries Ltd., Liverpool) to study mineral dressing practice in Great Britain, on the Continent and in the U.S.A. and Canada, with particular reference to the design, layout and operation of small-scale mills. **Mr. F. B. Peacock** (Dorman, Long and Co., Ltd., Middlesbrough) to study rolling mill operation and maintenance with particular reference to soaking pits, blooming mills and the production of universal beams, structural sections and rails. **Mr. A. M. Sage** (British Iron and Steel Research Association, London) to study the manufacture and fabrication of structural steels in the United Kingdom, Europe, U.S.A. and Canada.

Limited Strike Threat on Copperbelt

The Northern Rhodesia African Mineworkers' Union has officially notified the Chamber of Mines that a strike to support its demand for a wage increase of 10s. 8d. per shift will begin on January 3.

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BURMA MINES LIMITED

The following summarizes the Operating results of BURMA CORPORATION (1951) LIMITED (Incorporated in the Union of Burma and jointly owned by Burma Mines Limited and the Union Government) for the three months ended September 30, 1954.

ORE EXTRACTION

25,541 tons

PRODUCTION

Concentrating Ore Milled (tons)	*Oz. Silver*	*Assays % Lead*	*% Zinc*
24,495	14.461	18.125	11.995

Marketable Products were as follows:—

Refined Lead	2,615 tons
Refined Antimonial Lead	126 tons
Refined and Doré Silver Fine	227,175 oz.
Copper Matte	71 tons
Nickel Speiss	148 tons
Zinc Concentrates 57%-58% Zn. ...	3,347 tons

ESTIMATED REVENUE AND EXPENDITURE

Estimated Gross Revenue (after adjustment of value of metal stocks)	K.69.85,100	£523,882
Estimated Operating Expenditure	K.47,85,100	£358,882
Estimated Operating Profit ...	K.22,00,000	£165,000
Estimated Taxation	K.10.77,000	£80,775
Estimated Depreciation	K.1,45,700	£10,927
Capital Expenditure	K.4,13,200	£30,990

After deducting the foregoing estimates for Taxation and Depreciation the estimated Net Profit for the Quarter is K.9.77,300 (£73,298) which compares with a Net Profit of K.14.94,900 (£112,117) for the previous Quarter.

The Loss incurred for 1952/3 allowable for Taxation purposes was fully absorbed by the Profit realized for 1953/54. Profit for 1954/55 will therefore suffer tax at the full rate and provision for the first quarter has been made accordingly.

Sales of pre-war stocks of Zinc Concentrates, made possible by the resumption of transport and marketing facilities, have made a substantial contribution to the financial results.

The Sterling figures shown are based on a Rate of Exchange of 1s. 6d. per Kyat.

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Ayer Hitam Tin Dredging 1s. 3d. *i* (January 6)
Beralt Tin and Wolfram 50% *i* (January 25)
Cape Asbestos 2½% *i* (January 26)
De Beers Consolidated Mines 10s. (January 28)
"Shell" Transport and Trading 5% *i* (January 18)
Sn. Malayan Tin Dredging 20% (January 25)
Sn. Tronoh Tin Dredging 15% *i* (January 10)
Southern Tronoh Tin 9d. *i* (January 10)
Sungei Besi Mines 4 4/5d. *i* (January 20)
Tronoh Mines 1s. 3d. *i* (January 12)

***i* interim**

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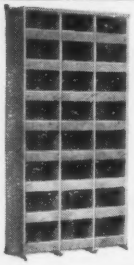

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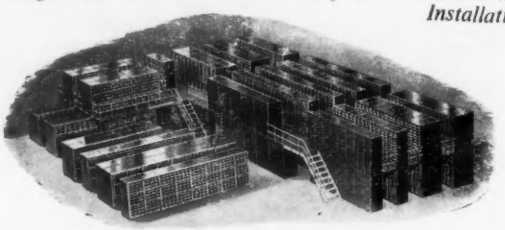

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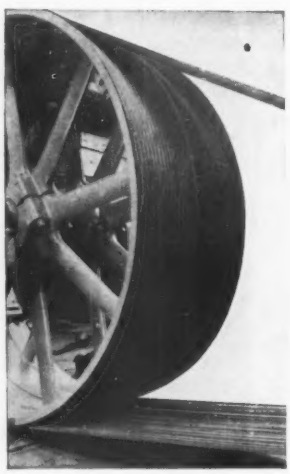

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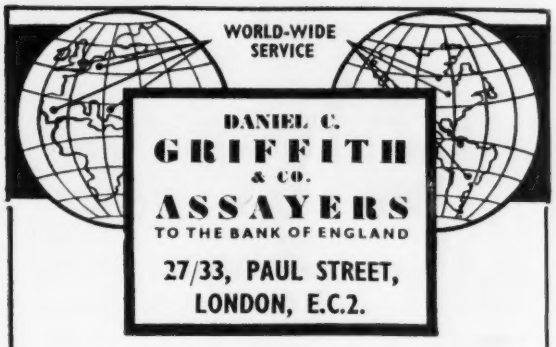

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